AUTHENTICITY DISCRIMINATING FORMER WITH FINE PERFORTION AND AUTHENTICITY DISCRIMINATING DEVICE

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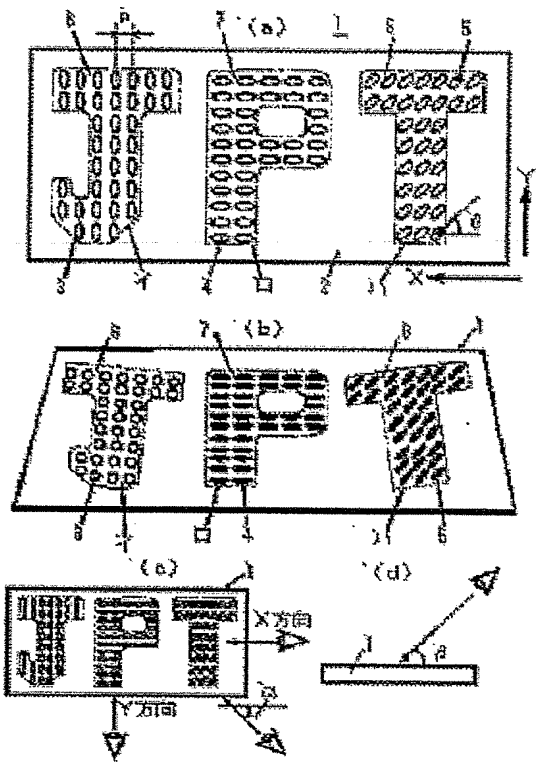
Abstract of **JP2002200872**

PROBLEM TO BE SOLVED: To give an antifalsifying effect without either impairing the designs of a printed matter or being conspicuous by a method wherein a large number of fine perforations, which are hard to see with the eye, are formed in some portion of various valuable printed matters such as securities, a passport, an identification card or the like. SOLUTION: On the base material 2 of an authenticity discriminating former 1, fine perforations 3, 4 and 5 are formed under the condition that the respective directions of arrangements of the perforations 3, 4 and 5 different from one another so as to recognize pattern and light and shade (or difference in density), resulting in allowing to discriminate is authenticity through observations, in which the direction and angle of observation are changed variously.



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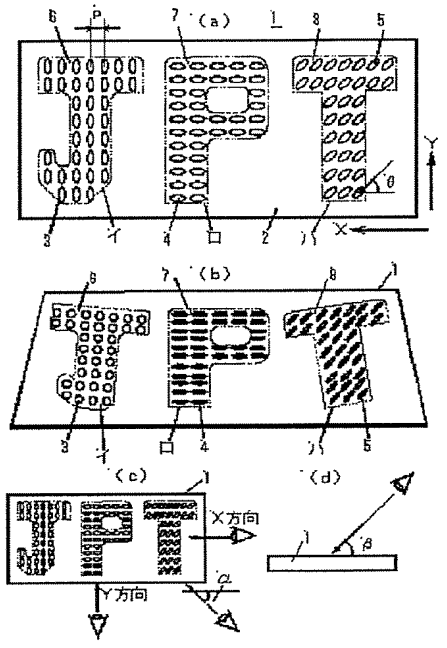
(54)【発明の名称】　微細な穿孔を有する真偽判別形成体及び真偽判別装置

(57)【要約】
【課題】有価証券、パスポート、身分証明書その他の各種の貴重印刷物の一部分に、目視しにくい多数の微細穿孔を形成して、そのデザインを損なうことなく、目立つことなく偽造防止効果を付与する。
【解決手段】真偽判別形成体１の基材２に、微細な穿孔３、４、５を形成し、穿孔３、４、５のそれぞれの配列方向を異なるように形成し、これを観察方向、観察角度をいろいろ変えて観察することにより、パターンやその明暗（濃度差）を認識し、真偽判別を可能とする。



【０００９】そして、本発明は、真偽判別に際して複雑、高価で特殊な装置によらなくても、真偽判別形成体の情報を目視で簡単に認識して判別できるようにするとともに、目視ではなく自動的な機械判別にも適している真偽判別形成体を実現することを課題とする。

【００１０】さらに、真偽判別形成体に盛り込む情報としては、単一の情報だけでなく、観察する観察方向、傾斜角度等により複数の情報を組み合わせることにより、偽造、変造をきわめて困難にすることを課題とする。

【００１１】

【課題を解決するための手段】本発明は上記課題を解決するために、基材を有し、該基材にパターン情報が画成される領域を有する真偽判別形成体であって、上記パターン情報が画成される領域内のみに、目視しにくい多数の微細な穿孔が形成されており、上記多数の微細な穿孔は、形状及び配列方向の少なくともいずれか一つが互いに異なり、上記基材を観察する方向及び角度の両方又は一方を変えることにより、認識される程度が異なる二種類以上の穿孔を含み、上記基材を観察する方向及び角度の両方又は一方を変えることにより、上記パターン情報全体の形状及び濃度の両方又は一方が異なって認識されることを特徴とする真偽判別形成体を提供する。

【００１２】さらに、本発明は上記課題を解決するために、基材を有し、該基材にパターン情報が画成される領域を有する真偽判別形成体であって、上記パターン情報が画成される領域内のみに、目視しにくい多数の微細な穿孔が形成され、該多数の微細な穿孔は、複数の穿孔群を構成しており、上記多数の微細な穿孔は、形状及び配列方向の少なくともいずれか一つが互いに異なり、上記基材を観察する方向及び角度の両方又は一方を変えることにより、認識される程度が異なる二種類以上の穿孔を含み、上記複数の穿孔群は、それぞれ当該穿孔群内では上記二種類以上の穿孔のうち、同種類の穿孔で構成されており、上記基材を観察する方向及び角度の両方又は一方を変えることにより、上記穿孔群毎に認識される程度が異なり、この結果上記パターン情報全体の形状及び濃度の両方又は一方が異なって認識されることを特徴とする真偽判別形成体を提供する。

【００１３】上記多数の微細な穿孔は、長細い穿孔であることを特徴とする。

【００１４】上記多数の微細な穿孔は、楕円又は長方形の穿孔であることを特徴とする。

【００１５】さらに、本発明は上記課題を解決するために、上記真偽判別形成体を判別する真偽判別装置であって、真偽判別形成体を上記基材の面に対して斜めの方向から撮影する撮像装置と、該撮像装置で撮影された真偽判別形成体の各穿孔の濃淡を認識して同じ濃淡のみの穿孔で形成される穿孔群で構成されるパターンを認識する画像処理装置とを備えていることを特徴とする真偽判別形成体を判別する真偽判別装置を提供する。

【００１６】

【発明の実施の形態】本発明に係る真偽判別形成体及び真偽判別装置の実施の形態を実施例に基づいて図面を参照して説明する。本発明の真偽判別形成体の特徴は、紙等のシート状の基材に、目視しにくい多数の微細な穿孔を形成し、この穿孔は、形状及び配列方向の少なくともいずれか一つが互いに異なる二種類以上の穿孔に形成されて情報を付与するものである。

【００１７】ここで、形状が異なるとは、楕円、長方形、鼓型、三角等基本的な形状が異なる場合もあるし、あるいは基本的な形状は同じでも縦と横の寸法比が異なる。すなわち相似でない形状の異なる場合（例．楕円でもより細長い楕円、円に近い楕円等）もある。又、配列方向が異なるとは、基材平面内において穿孔の向きが異なる場合をいう。

【００１８】穿孔は、目視では判別困難な微細な大きさとするため、直径０．１～０．３ｍｍ程度の円を基準に考え、これと同程度の大きさの上記、楕円、長方形、鼓型、三角形等で基材平面に沿って、縦及び横方向に互いに異なる長さを有する穿孔であればいろいろな形状が可能である。穿孔は、近年技術進歩のめざましい精密加工技術、例えば、レーザ穿孔技術等により形成される。

【００１９】真偽判別形成体の文字情報の読み取り（観察ともいう）は、目視又は光学的な機械読取装置を使用して行われる。いずれにしろ、その読み取りは、基本的にはその背面から光を照射させて、穿孔を通過する透過光により文字、図形、模様、数字、バーコード等のパターン情報のパターンやその明暗（濃度差）を認識して行うものである。

【００２０】（実施例１）図１、２は本発明の実施例１を説明する図である。図１（ａ）は本発明の真偽判別形成体１を示す。紙等のシート状の基材２に、目視しにくい多数の微細な穿孔３、４、５が、一定のピッチでもって形成、配列されて、真偽判別形成体１が構成されている。この実施例１では、多数の穿孔３、４、５は、それぞれ想像線でイ、ロ、ハで示す「Ｊ」、「Ｐ」、「Ｔ」という３つの文字の領域をそれぞれ画成する３つの穿孔群６、７、８を構成しており、これによって、「ＪＰＴ」という文字のパターン情報の領域を画成している。

【００２１】文字「Ｊ」を画成する穿孔群６の穿孔３は、全て基材平面に沿ってＹ（縦）方向（図中上下方向）に長径の楕円である。文字「Ｐ」を画成する穿孔群７の穿孔４は、全て基材平面に沿ってＸ（横）方向（図中左右方向）に長径の楕円である。文字「Ｔ」を画成する穿孔群８の穿孔５は、全て基材平面に沿ってＸ軸に対して一定の角度θだけ斜め方向に長径の楕円である。要するに、穿孔群６、７、８を構成する穿孔３、４、５は互いに異なる三種類の穿孔である。

【００２２】これらの楕円の微細な穿孔３、４、５は、レーザ穿孔技術等、例えば炭酸ガスレーザを利用して形

入らず見えない。これによって、観察方向と同じ向きの長径を有する楕円穿孔群と、これと異なる向きの楕円穿孔群からの透過光量の差に基づき、穿孔群のそれぞれの文字情報に明暗（濃淡）が生じる。

【００３７】このように、穿孔群６～８は、真偽判別形成体１の面に対する観察角度によって、そして観察方向と楕円穿孔の向きの関係によって、目視可能・不可能、明暗（濃淡）発生等、多様にその見え方が変化する。従って、観察者は、真偽判別形成体１を、観察角度及び観察方向をいろいろ変えて観察することにより、真正な真偽判別形成体１とその他のものとを判別することが可能となる。

【００３８】図３は、実施例１の真偽判別形成体１を機械読取する場合の真偽判別装置９を説明する図である。真偽判別形成体１をライトテーブル１０上に置いて、その透過光による真偽判別形成体１の画像を正対してカメラ１１（ＣＣＤカメラ等）で撮影した場合は、実施例１同様に、「ＪＰＴ」の文字情報のパターンを読み取り、これをコンピュータ７の画像処理によってパターン認識し、真偽判別の一要素とすることが可能である。

【００３９】また、ライトテーブル１０上に置かれた真偽判別形成体１に対して、カメラ１１で斜め上方からＸ方向（あるいは図示しないがＹ方向）を撮影した場合は、ライトテーブル１０からの透過光がカメラ１１に十分入り、明るく認識できる穿孔から成る穿孔群、光が透過せず認識できない穿孔から成る穿孔群、及び透過光が半透過状態で暗く見える穿孔から成る穿孔群により、文字情報のパターン及びその明暗（濃淡）を撮影することができる。

【００４０】そして、このパターン及びその明暗（濃淡）をコンピュータ１２の画像処理によって二値化し、この二値化データを予め記憶されている真正な真偽判別形成体のデータと比較して、真偽判別を機械的に行うことが可能である。さらに、９０°回転した方向から、同様に撮影した後画像処理を行うことで、さらにきめ細かいデータを得て、より真偽判別の精度を上げることも可能である。

【００４１】このような真偽判別形成体１及び真偽判別装置９を利用すれば、情報の機械的な読取、認識が可能である。真偽判別形成体１の穿孔の大きさを、レーザ加工機を利用しないと不可能な程度に微細にすれば、穿孔形成のために高額な装置が必要であり、偽造防止に有効であると考えられる。又、微細な穿孔であるため、この真偽判別形成体が付与されるもの（例えば有価証券）のデザインを損なうことがない。情報としては、文字、数字、模様、図形、バーコード等がある。

【００４２】なお、実施例１に係る真偽判別形成体１の特徴をより明確にするために、従来技術と比較してみる。穿孔することによりパターンを認識するものとしては上述のとおり、従来、単に文字や数字を穿孔配列によって表現したもの（例．スイス２００フラン券）や、濃淡画像を二値化した後、陰影部を穿孔して肖像を表現しているもの等が知られている。

【００４３】これに対し、実施例１に係る真偽判別形成体１は、パターン情報の付与される領域が、穿孔群毎に異なる方向に配列されているものも含むことから、通常、正対して観察しただけでは情報の真偽を完全に判別することが困難だが、光にかざして、真偽判別形成体１の面内の観察方向及び基材平面に対する観察角度を変えることにより、穿孔群毎に明暗（濃淡）が変化したり、認識可能・不可能に反転することから、真偽判別形成体１のよりきめ細かな情報を認識することができる。

【００４４】また、従来、潜像を有するものとしては、潜像凹版（画線の方向とインキの盛り量とにより潜像凹版を施したもの）、あるいは偽造防止用潜像模様形成体１及びその作成方法（特許第２６１５４０１号参照）等が知られているが、これらは反射光を観察するものであり、しかも観察の方向を１８０°変えたときに濃淡の変化が反転するものであり、実施例１に係る真偽判別形成体１とは本質的に異なる性質のものである。

【００４５】（実施例２）図４、５は、本発明の実施例２を説明する図である。実施例２の真偽判別形成体１３は、実施例１同様に、紙等のシート状の基材２に、目視しにくい多数の微細な穿孔が一定のピッチでもって形成、配列されている。

【００４６】しかしながら、実施例１では、多数の穿孔は、想像線で示す「Ｊ」、「Ｐ」、「Ｔ」という互いに独立した３つの文字の領域をそれぞれ画成する３つの穿孔群６、７、８を構成するものであるが、実施例２の多数の穿孔は、全体として図４（ａ）に示すように、想像線ニで囲む四角形１４を画成している。

【００４７】さらに、実施例２の多数の穿孔は、この四角形１４内で、想像線ホで仕切られた部分的に左側部、中央部、右側部の３つの領域１５、１６、１７を画成する穿孔群１８、１９、２０を構成している。穿孔群１８、１９、２０は、互いに異なる方向に配列された同形の楕円穿孔２１、２２と、楕円ではあるが異なる形状の楕円穿孔２３の三種類から構成されている。

【００４８】楕円穿孔２１、２２、２３の大きさは、実施例１同様に、穿孔の大きさは目視できない程度の寸法であり、直径０．１～から０．３ｍｍの円を基準に考え、これと同程度の大きさの楕円とする。例えば、楕円の穿孔形状を、短径：０．１５ｍｍ、長径：０．２～０．４ｍｍ、ピッチ（穿孔間の間隔）：０．４ｍｍ～０．８ｍｍに穿孔する。

【００４９】四角形の左側の領域１５を画成する穿孔群１８の穿孔２１は、基材平面に沿ってＸ（横）方向（図中左右方向）に長径の楕円である。四角形の中央の領域１６を画成する穿孔群１９の穿孔２２は、基材平面に沿ってＹ（縦）方向（図中上下方向）に長径の楕円であ

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物の一部分にそのデザインを損なうことなく、目立つことなく適用できる。

【図面の簡単な説明】

【図１】本発明に係る真偽判別形成体の実施例１を説明する図である。

【図２】本発明に係る真偽判別形成体の実施例１を説明する図である。

【図３】本発明に係る真偽判別形成体の真偽判別装置を説明する図である。

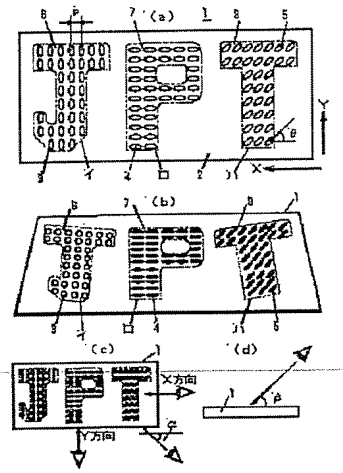
【図４】本発明に係る真偽判別形成体の実施例２を説明する図である。

【図５】本発明に係る真偽判別形成体の実施例２を説明＊する図である。

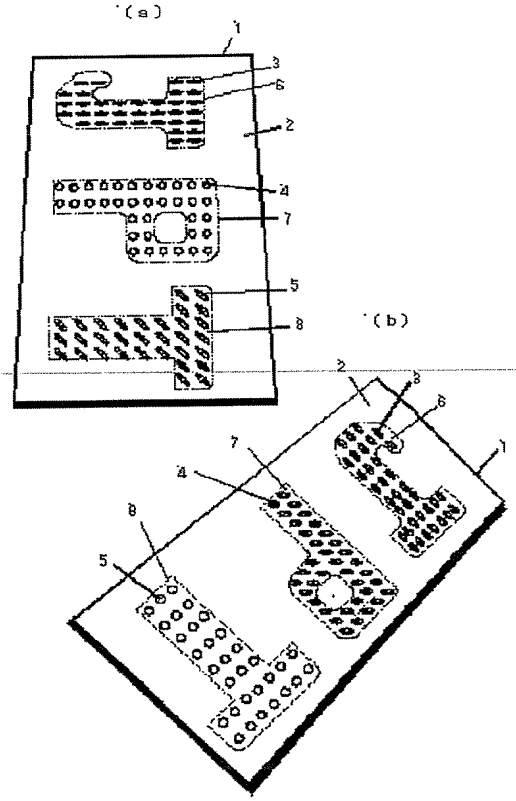
【符号の説明】

１、１３　真偽判別形成体
２　基材
３、４、５、２１、２２、２３　穿孔
６、７、８、１８、１９、２０　穿孔群
１０　ライトテーブル
１１　カメラ
１２　コンピュータ
１４　四角形
１５、１６、１７　領域（四角形の一部の領域）

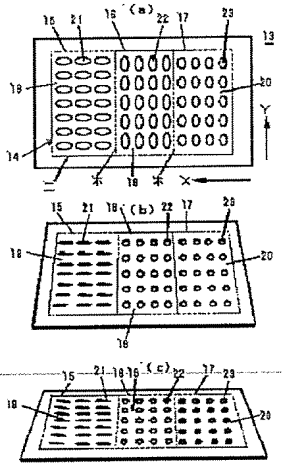
【図１】



【図２】



【図４】



JP 2002-200872

CLAIMS [Claim(s)]

[Claim 1]It is a truth distinction organizer which has a substrate and has a field where pattern information is formed by this substrate, Only in a field where the above-mentioned pattern information is formed, detailed punching of a large number which are hard to view is formed, and detailed punching of above-mentioned a large number, By shape's differing from an arrangement direction mutually [any at least one], and changing [which observes the above-mentioned substrate / either / both or] a direction or an angle, A truth distinction organizer, wherein shape of the above-mentioned whole pattern information differs [either / both or] from concentration and it is recognized by changing [which observes the above-mentioned substrate / either / both or] a direction or an angle including two or more kinds of punching where grades recognized differ.

[Claim 2]It is a truth distinction organizer which has a substrate and has a field where pattern information is formed by this substrate, Only in a field where the above-mentioned pattern information is formed, detailed punching of a large number which are hard to view is formed, and detailed punching of these large number constitutes two or more punching groups, and detailed punching of above-mentioned a large number, By shape's differing from an arrangement direction mutually [any at least one], and changing [which observes the above-mentioned substrate / either / both or] a direction or an angle, A grade recognized including two or more kinds of different punching two or more above-mentioned punching groups, By changing [which is constituted in punching of the same kind among the two or more above-mentioned kinds of punching within the punching group concerned, respectively, and observes the above-mentioned substrate / either / both or] a direction or an angle, A truth distinction organizer characterized by what grades recognized for every above-mentioned punching group differ, and shape of the above-mentioned whole pattern information differs [either / both or] from concentration as a result, and is recognized.

[Claim 3]The truth distinction organizer according to claim 1 or 2, wherein detailed punching of above-mentioned a large number is slender punching.

[Claim 4]The truth distinction organizer according to claim 1, 2, or 3, wherein detailed punching of above-mentioned a large number is punching of an ellipse or a rectangle.

[Claim 5]Above-mentioned claims 1-4 characterized by comprising the following are the truth discriminating devices which distinguish a truth distinction organizer of a statement either.

An imaging device which photos a truth distinction organizer from the direction of slanting to a field of the above-mentioned substrate.

An image processing device which recognizes a shade of each punching of a truth distinction organizer photoed with this imaging device, and recognizes a pattern constituted from a punching group formed in punching of only the same shade.

DETAILED DESCRIPTION [Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the truth distinction organizer which enables truth distinction by machinery, and its discriminating device while giving the effect which controls forgery and alteration to valued printed matter, such as a bill, a passport, negotiable securities, a card, and stamps.

[0002]

[Description of the Prior Art]It is required that valued printed matter, such as a bill, a passport, negotiable securities, a card, and stamps, should be forged, and should be hard to be altered on the character. As this preventive measure, a water mark, detailed streak composition, intaglio printing, etc. are publicly known. It combined, and since these valued printed matter needs to carry out machine processing of truth distinction and others, it needs to be provided with the machinery reading element. For this reason, the coat or the method of mixing is used for substrates which mix a special substance in ink, such as a method and paper, in the special substance.

[0003]Like Switzerland of 200 francs, there is also an example which is expressing the character or the number according to punching arrangement. The shade image of a portrait is binary-ized and there is also an example which expressed the shade-and-shadow part of the portrait based on the binary-ized data expressing a shade.

[0004]

[Problem(s) to be Solved by the Invention]However, a water mark is difficult to serve as a perfect forgery prevention means from being producible in false with a varnish etc. among such forgery prevention means. Truth distinction is becoming impossible [detailed streak composition] easily from being mostly reproducible with a color copying machine. Also in an intaglio, since a big area is needed in order to give sufficient finger sensibility, many problems will arise on a design.

[0005]Although the magnetic ink used for the bill is typical as ink used for machinery reading of valued printed matter, the tolerance level of the truth distinction with the viewpoint on circulation is wide, and the actual condition is that the perfect truth distinction element cannot become. That composition becomes complicated and, moreover, truth distinction is not necessarily easy for a means to imitate and punch punching arrangement in the example of Switzerland of 200 francs, to be able to forge, to be able to alter, to change a shade into binary-ized data, to change into the boring location x and y, i.e., coordinates, according to this data, and to express a portrait, either.

[0006]By the way, the processing technology of detailed punching development of the high precision processing technology of detailed punching to substrates, such as recent years, a paper, a film, or a metal plate, is remarkable, for example, according to laser, It combines with the ability of arbitrary hole layouts to be performed easily, and there is little generating of the barricade at the time of punching far compared with mechanical punching with the needle forgery and for the purpose of alteration, etc.

[0007]This invention uses the high precision processing technology of such detailed punching, and makes it a technical problem to realize the truth distinction organizer which was excellent in forgery aiming at solving the above-mentioned conventional problem, and an alteration preventive effect, and a truth discriminating device. That is, punching of detailed a large number which are hard to view is formed, by the truth distinction organizer which gives information, including a number, a character, a pattern, a figure, a bar code, etc., the truth distinction is enabled and forgery and prevention from alteration are performed.

[0008]This invention makes it a technical problem for forgery and alteration to realize a very difficult truth distinction organizer by changing shape and an arrangement direction into the field to which the pattern information of a substrate is formed, and giving detailed punching which a large number cannot view easily to it using high precision processing technology.

[0009]And it makes it a technical problem to realize a truth distinction organizer suitable also for the automatic machinery distinction instead of viewing while it recognizes the information on a truth distinction organizer simply and it enables it to distinguish it visually, even if this invention is not based on a complicated, expensive, and special device on the occasion of truth distinction.

[0010]Let it be a technical problem to make forgery and alteration very difficult by combining two or more information as information incorporated in a truth distinction organizer not only with single information but with an observation direction, an angle of gradient, etc. to observe.

[0011]

[Means for Solving the Problem]In order that this invention may solve an aforementioned problem, it is a truth distinction organizer which has a substrate and has a field where pattern information is formed by this substrate, Only in a field where the above-mentioned pattern information is formed, detailed punching of a large number which are hard to view is formed, and detailed punching of above-mentioned a large number, By shape's differing from an arrangement direction mutually [any at least one], and changing [which observes the above-mentioned substrate / either / both or] a direction or an angle, A truth distinction organizer, wherein shape of the above-mentioned whole pattern information differs [either / both or] from concentration and it is recognized is provided by changing [which observes the above-mentioned substrate / either / both or] a direction or an angle including two or more kinds of punching where grades recognized differ.

[0012]In order that this invention may solve an aforementioned problem, it is a truth distinction organizer which has a substrate and has a field where pattern information is formed by this substrate, Only in a field where the above-mentioned pattern information is formed, detailed punching of a large number which are hard to view is formed, and detailed punching of these large number, Constitute two or more punching groups and detailed punching of above-mentioned a large number, By shape's differing from an arrangement direction mutually [any at least one], and changing [which observes the above-mentioned substrate / either / both or] a direction or an angle, A grade recognized including two or more kinds of different punching two or more above-mentioned punching groups, By changing [which is constituted in punching of the same kind among the two or more above-mentioned kinds of punching within the punching group concerned, respectively, and observes the above-mentioned substrate / either / both or] a direction or an angle, Grades recognized for every above-mentioned punching group differ, and a truth distinction organizer, wherein shape of the above-mentioned whole pattern information differs [either / both or] from concentration and it is recognized as a result is provided.

[0013]Detailed punching of above-mentioned a large number is characterized by being slender punching.

[0014]Detailed punching of above-mentioned a large number is characterized by being punching of an ellipse or a rectangle.

[0015]A truth discriminating device which distinguishes the above-mentioned truth distinction organizer in order that this invention may solve an aforementioned problem which is characterized by that a truth discriminating device which distinguishes a truth distinction organizer comprises the following.

An imaging device which photos a truth distinction organizer from the direction of slanting to a field of the above-mentioned substrate.

An image processing device which recognizes a pattern which comprises a punching group which recognizes a shade of each punching of a truth distinction organizer photoed with this imaging device, and is formed in punching of only the same shade.

[0016]

[Embodiment of the Invention]The embodiment of the truth distinction organizer concerning this invention and a truth discriminating device is described with reference to drawings based on an example. The feature of the truth distinction organizer of this invention forms detailed punching of a large number which are hard to view to sheet shaped substrates, such as paper, and this punching is formed in punching beyond two kinds such as shape and an arrangement direction from which any at least one differs mutually, and gives information.

[0017]shape differs here -- an ellipse, a rectangle, a hard drum type, and Hitoshi Misumi -- fundamental shape may differ, or even when fundamental shape is the same, the proportions of length and width differ. That is, the shape which is not similarity may differ (example . with an ellipse nearby a long and slender ellipse, the ellipse near a circle, etc.). That arrangement directions differ means the case where direction of punching differs in a substrate flat surface.

[0018]Since it is visually considered as a detailed size with difficult distinction, if punching is punching which has length which thinks on the basis of a circle about 0.1-0.3 mm in diameter, and is mutually different in length and a transverse direction along a substrate flat surface with the above of a size comparable as this, an ellipse, a rectangle, a hard drum type, a triangle, etc., various shape is possible for it. Punching is formed in recent years, the remarkable high precision processing technology, for example, the laser punching art etc., of technical progress, etc.

[0019]Reading (it is also called observation) of the text of a truth distinction organizer is performed using viewing or an optical machinery reader. use any -- fundamentally, the reading makes it irradiate with light from the back, and is performed by recognizing the pattern of pattern information, such as a character, a figure, a pattern, a number, and a bar code, and its light and darkness (density difference) by the transmitted light which passes through punching.

[0020](Example 1) Drawing 1 and 2 are the figures explaining Example 1 of this invention. Drawing 1 (a) shows the truth distinction organizer 1 of this invention. The detailed punching 3, 4, and 5 of a large number which are hard to view is formed as it is also at a fixed pitch, and it is arranged by the sheet shaped substrates 2, such as paper, and the truth distinction organizer 1 is constituted. In this Example 1, many punching 3, 4, and 5 constitutes the three punching groups 6, 7, and 8 which form the field of the three characters "J", "P", and "T" which are shown by I, RO, and Ha, respectively from a fictitious outline, respectively, and is forming the field of the pattern information of the character "JPT" by this.

[0021]The punching 3 of the punching group 6 which forms the character "J" is an ellipse of a major axis along a substrate flat surface at the direction (figure Nakagami down) of Y (length) altogether. The punching 4 of the punching group 7 which forms the character "P" is an ellipse of a major axis along a substrate flat surface at X (width) directions (longitudinal direction in a figure) altogether. The punching 5 of the punching group 8 which forms the character "T" is an ellipse of a major axis in an oblique direction only the fixed angle theta to the X-axis along a substrate flat surface altogether. In short, the punching 3, 4, and 5 which constitutes the punching groups 6, 7, and 8 is three kinds of mutually different punching.

[0022]The detailed punching 3, 4, and 5 of these ellipses is formed using carbon dioxide gas laser, such as laser punching art. And the size of the punching 3, 4, and 5 is a size of the grade which cannot be viewed, and as above-mentioned, it is considered on the basis of a 0.3-mm circle from diameter 0.1-, and let it be an ellipse of a size comparable as this. For example, the punching shape of an ellipse is punched at minor-axis:0.15mm, major-axis:0.2-0.4mm, and the pitch of p (interval between punching shown in drawing 1 (a)):0.4 mm - 0.8 mm.

[0023]Reading of the text of the truth distinction organizer 1 makes it irradiate with light from the back, uses viewing or an optical machinery reader, and performs the pattern of text, and recognition of the light and darkness (shade) by the transmitted light which passes through the punching 3, 4, and 5.

[0024]this -- in reading truth distinction organizer 1 (observation), the read direction (observation direction) and reading angle (observing angle) of the truth distinction organizer 1 are very important. Here, a read direction (observation direction) is the direction of length, width, and slant (the angle [correctly as opposed to the X-axis] alpha) in the field of the truth distinction organizer 1, as shown in drawing 1 (c). as it is indicated in drawing 1 (d) as a reading angle (observing angle), the field of the truth distinction organizer 1 is received -- it reads (observation) and is the angle beta of a direction.

[0025]Now, even if an observer looks at the truth distinction organizer 1 in the usual state (state which does not irradiate with light in particular from the back), since the punching 3, 4, and 5 is detailed, visually, it not only cannot check each of the shape, but he cannot recognize the punching groups 6-8 thru/or the text "JPT."

[0026]Then, an observer holds up the truth distinction organizer 1 to light, namely, the truth distinction organizer 1 is irradiated from the back of the truth distinction organizer 1, and it observes visually from the front. When the truth distinction organizer 1 is carried out for right and observed in the state of drawing 1 (a), the transmitted light from all of the punching 3, 4, and 5 will go into an observer's eyes. Since the size of punching is the same, the text "JPT" looks bright to the same extent altogether, and can be recognized visually.

[0027]Next, as shown in drawing 1 (b), the truth distinction organizer 1 is held up to light, and an observer explains the case where it moreover observes with the upper slanting observing angle beta to the flat surface of the truth distinction organizer 1 to the observation direction (it is from a near side in drawing 1 (b)) of the direction of Y in the flat surface of the truth distinction organizer 1.

[0028]Since the punching 3 of the punching group 6 of a character "J" is an ellipse of a major axis at the direction of Y, the transmitted light of the punching group 1 from the back goes into eyes well at an observer, and the character "J" looks brightly (deeply) and can recognize it visually. However, since the punching 4 of the punching group 7 of a character "P" is an ellipse (ellipse which intersects perpendicularly in the direction of Y) of a minor axis at the direction of Y, the transmitted light of the punching group 7 from the back hardly goes into eyes at an observer, and it cannot recognize the character "P" visually.

[0029]and -- since the punching 5 of the punching group 8 of a character "T" is an ellipse of a major axis to the X-axis at direction of the angle theta as above-mentioned, although the transmitted light of the punching group 3 from the back is little as compared with the punching group 1, it goes into an observer's eyes -- a character "T" -- so much -- it is not bright (palely) -- it can recognize visually.

[0030]Drawing 2 (a) is a case where the truth distinction organizer 1 is moreover observed with the upper slanting observing angle beta from the observation direction of the direction of X in the field in drawing 1 (a). Of course, in drawing 1 (a), even when 90 degrees rotated clockwise relatively to the observer in the field, it is an observation direction of the direction of Y and the truth distinction organizer 1 is moreover observed with the observing angle beta from the slanting upper part to the flat surface, it is the same.

[0031]Since the punching 3 of the punching group 6 of a character "J" is an ellipse of a minor axis in an observation direction at drawing 2 (a), the transmitted light from the back of the truth distinction organizer 1 does not go into an observer's eyes, and, visually, the character "J" cannot be recognized. However, since the punching 4 of the punching group 7 of a character "P" is an ellipse of a major axis in an observation direction, the transmitted light from the back goes into an observer's eyes enough, the character "P" looks brightly (deeply), and it can recognize it visually clearly.

[0032]In short, about the character "J" of this truth distinction organizer 1, and "P", if direction with another 90 degrees to the truth distinction organizer 1 is moreover observed from an upper slanting observing angle from the observation direction rotated 90 degrees relatively to an observer in that field, the recognition good of a character and a failure will be reversed. About a character "T", like the case of drawing 1 (a), although it is not so bright, it can recognize visually.

[0033]Drawing 2 (b) is a case where are the observation direction same in the field as the major axis direction of punching of the punching group of a character "T", and the truth distinction organizer 1 is moreover observed with an upper slanting observing

angle, in drawing 1 (a). Of course, it is the same, even when the truth distinction organizer 1 is relatively rotated to an observer in the field and it moreover observes with the upper slanting observing angle beta so that it may become the same observation direction as this.

[0034]In drawing 2 (b), since the observation direction is the same as the major axis direction of the punching 5 of the punching group 8 of a character "T", the transmitted light from the back goes into an observer's eyes enough, and the character "T" looks bright (deeply) and can be recognized visually clearly. however -- since the punching 4 and 5 of the punching groups 6 and 7 of a character "P" and "T" has the slanting major axis of punching to an observation direction -- so much -- it is not bright (light) -- it can recognize visually.

[0035]Above, in short, when the truth distinction organizer 1 is observed from the slanting upper part with the observing angle beta to the field of the substrate 2, the transmitted light from the back which passes through an observation direction and ellipse punching which has a major axis of the same direction is easy to go into an observer's eyes enough, and visible, but. Only most or a few of the transmitted light from ellipse punching where direction differs enters and is visible to an observer's eyes, or it becomes hard to see.

[0036]The degree whose transmitted light is visible changes with degrees from which the direction of the major axis of ellipse punching to an observation direction differs. The transmitted light in particular that passes through ellipse punching which has a major axis in an observation direction and the right-angled direction hardly goes into an observer's eyes, and is not visible. By this, light and darkness (shade) arise in each text of a punching group based on the difference of the transmitted light amount from an observation direction, the ellipse punching group which has a major axis of the same direction, and the ellipse punching group of different direction from this.

[0037]Thus, as for the punching groups 6-8, the way of being visible changes with the observing angle to the field of the truth distinction organizer 1, and the relation between an observation direction and direction of ellipse punching variously - impossibility which can be viewed, light-and-darkness (shade) generating, etc. Therefore, an observer becomes possible [distinguishing the genuine truth distinction organizer 1 and other things] by changing various observing angles and observation directions, and observing the truth distinction organizer 1.

[0038]Drawing 3 is a figure explaining the truth discriminating device 9 in the case of carrying out machinery reading of the truth distinction organizer 1 of Example 1. When the truth distinction organizer 1 is placed on the light table 10, the right opposite of the picture of the truth distinction organizer 1 by the transmitted light is carried out and a photograph is taken with the cameras 11 (CCD camera etc.), It is possible to read the pattern of the text of "JPT", to carry out the pattern recognition of this by image processing of the computer 7 like Example 1, and to consider it as an element of truth distinction.

[0039]When the direction (or although not illustrated the direction of Y) of X is photoed from the slanting upper part with the camera 11 to the truth distinction organizer 1 placed on the light table 10, By the punching group which comprises punching which the transmitted light from the light table 10 goes into the camera 11 enough, and can recognize brightly, the punching group which comprises punching which light cannot penetrate and recognize, and the punching group to which the transmitted light changes from punching which looks dark in the state of semi transmission. The pattern of text and its light and darkness (shade) can be photoed.

[0040]And as compared with the data of the genuine truth distinction organizer which carries out binarization of this pattern and its light and darkness (shade) by image processing of the computer 12, and is beforehand memorized in this binarization data, it is possible to perform truth distinction mechanically. It is also possible to obtain still finer data and to raise the accuracy of truth distinction by performing image processing, after taking a photograph similarly from the direction rotated 90 degrees more.

[0041]If such a truth distinction organizer 1 and the truth discriminating device 9 are used, mechanical reading of information and recognition are possible. If a laser beam machine is not used and the size of punching of the truth distinction organizer 1 will be made detailed to an impossible grade, a device big-ticket for punching formation will be required, and it will be thought that it is effective in forgery prevention. Since it is detailed punching, the design of what this truth distinction organizer is given (for example, negotiable securities) is not spoiled. As information, there are a character, a number, a pattern, a figure, a bar code, etc.

[0042]In order to clarify more the feature of the truth distinction organizer 1 concerning Example 1, it compares with conventional technology. As what recognizes a pattern by punching, what only expressed the character and the number according to punching arrangement conventionally as above-mentioned (example . Switzerland ticket of 200 francs), the thing which punches a shade-and-shadow part and is expressing the portrait after carrying out binarization of the shade image, etc. are known.

[0043]On the other hand, although the truth distinction organizer 1 concerning Example 1 is difficult to usually distinguish the truth of information from the field where pattern information is given containing what is arranged in the different direction for every punching group thoroughly only by having carried out for right and observing, Since light and darkness (shade) change for every punching group by holding up to light and changing the observing angle to the observation direction and substrate flat surface within the field of the truth distinction organizer 1 or it is reversed possible [recognition] and impossible, the finer information on the truth distinction organizer 1 can be recognized.

[0044]Although a latent image intaglio (what gave the latent image intaglio with the direction of a streak and the amount of peaks of ink) or the latent image encaustic organizer 1 for forgery prevention, a preparation method (refer to patent No. 2615401) for the same, etc. are conventionally known as what has a latent image, The truth distinction organizer 1 which these observe catoptric light, change of a shade reverses them at when 180 degrees of the directions of observation are moreover changed, and starts Example 1 is a thing of intrinsically different character.

[0045](Example 2) Drawing 4 and 5 are the figures explaining Example 2 of this invention. Like Example 1, detailed punching of a large number which are hard to view to the sheet shaped substrates 2, such as paper, is formed as it is also at a fixed pitch, and the truth distinction organizer 13 of Example 2 is arranged.

[0046]However, although many punching constitutes the three punching groups 6, 7, and 8 which form the field of the three characters "J", "P", and "T" which are shown with a fictitious outline which carried out mutually-independent, respectively from Example 1, Many punching of Example 2 is forming the quadrangle 14 enclosed with fictitious-outline NI, as shown in drawing 4 (a) as a whole.

[0047]Many punching of Example 2 constitutes the punching groups 18, 19, and 20 which were divided with fictitious-outline HO and which form the three fields, a left side part, a center section, and a right side part, 15, 16, and 17 selectively within this quadrangle 14. The punching groups 18, 19, and 20 comprise three kinds of the isomorphous ellipse punching 21 and 22 arranged in the mutually different direction, and the ellipse punching 23 of shape which is different although it is an ellipse.

[0048]Like Example 1, the size of punching is a size of the grade which cannot be viewed, it is considered on the basis of a 0.3-mm circle from diameter 0.1-, and the size of the ellipse punching 21, 22, and 23 lets it be an ellipse of a size comparable as this. For example, the punching shape of an ellipse is punched at minor-axis:0.15mm, major-axis:0.2-0.4mm, and pitch (interval between punching):0.4mm-0.8mm.

[0049]The punching 21 of the punching group 18 which forms the field 15 on the left-hand side of square is an ellipse of a major axis along a substrate flat surface at X (width) directions (longitudinal direction in a figure). The punching 22 of the punching group 19 which forms the field 16 of a square center is an ellipse of a major axis along a substrate flat surface at the direction (figure Nakagami down) of Y (length). Although the punching 23 of the punching group 20 which forms the field 17 on the right-hand side of square is an ellipse of a major axis along a substrate flat surface at the direction (figure Nakagami down) of Y (length), its size (for example, 0.3 mm) of a major axis is smaller than the major axis (for example, 0.4 mm) of punching of the punching group 2.

[0050]Here an observer in the usual state (in the state where what holds up especially to light is not done). When the truth distinction organizer 13 is carried out for right and observed (it is from the observing angle of 90 degrees to the field of the substrate 2), the punching 9-11 is detailed, and since viewing of the punching groups 18-19 is also difficult, it not only cannot check each of the shape, but it cannot recognize information visually.

[0051]Then, an observer holds up the truth distinction organizer 13 to light, namely, the truth distinction organizer 13 is irradiated with the light from the back of the truth distinction organizer 13, and if it carries out for right and observes from the front, the quadrangle 14 can be recognized by viewing by the transmitted light of the punching 18-19.

[0052]Next, as shown in drawing 4 (b), when it observes from the upper part of 30 degrees of near-side slant to the flat surface of the truth distinction organizer 13 in the observation direction of the direction of Y, the light from the back of the truth distinction organizer 13, Since the transmitted light from the punching 21 of the punching group 18 which is a minor axis hardly goes into an observer's eyes in the direction of Y, the field 15 of the right-hand side formed by the punching group 18 almost disappears. On the other hand, the transmitted light from the punching 22 of the punching group 19 of a major axis goes into an observer's eyes in the direction of Y, the field 16 of a center section and the field 17 of a right side part which are formed by the punching group 19 look bright, and recognition is possible by viewing.

[0053]Since the transmitted light from the punching 21 of the left-hand side punching group 18 does not look being the same as that of the above if it observes from the upper part of 20 degrees of near-side slant to the flat surface of the truth distinction organizer 13 in the observation direction of the direction of Y as shown in drawing 4 (c), Although the field 15 formed by the punching group 18 cannot be recognized visually, the field 16 which the transmitted light from the punching 22 of the central punching group 19 goes into an observer's eyes, and is formed by the punching group 19 can be recognized visually brightly (deeply).

[0054]However, since the punching 23 of the right-hand side punching group 20 has the short size of the major axis of an ellipse as compared with the punching 22 of the central punching group 19, the transmitted light amount included in an observer's eyes decreases, and although the recognition of the field 17 formed by the punching group 20 is visually possible, it looks dark (palely).

[0055]Drawing 5 shows the case where it observes from the upper part of 30 degrees of slant in the observation direction of the direction of X, from the method of right-hand side to the flat surface of the truth distinction organizer 13 in drawing 4 (a). In this case, the field 15 which the transmitted light from the punching 21 of the punching group 18 of a major axis goes into an observer's eyes in the direction of X, and forms the light from the back of the truth distinction organizer 13 by the punching group 18 can do recognition by vanity viewing brightly. However, since the transmitted light from the punching 22 and 23 of the punching groups 19 and 20 which are major axes hardly goes into an observer's eyes in the direction of Y, visually, the fields 16 and 17 formed by the punching groups 19 and 20 cannot be recognized.

[0056]This invention is applicable to a figure as shown not only in the pattern of text like Example 1 but in Example 2 in short, signs that it does not illustrate, etc. By providing the punching group of two or more kinds which form a field selectively within the same figure or a pattern, i.e., the punching group of several kinds from which shape and an arrangement direction differ, when it applies to a figure, a pattern, etc., Recognition of a selectively different pattern and light and darkness (shade) of this is enabled within the same figure or a pattern by changing and observing an observation direction and an observing angle, and truth distinction of the truth distinction organizer 13 is attained.

[0057]In Example 2, several information which changed from a different observing angle with the same ellipse with things with the same arrangement direction for which the size of the major axis is changed into plurality but (it is equivalent to shape differing.) can recognize visually easily, without using the device for truth distinction, etc. especially.

[0058]It is making it detailed to such an extent that it cannot form, if a laser beam machine is not used the size of punching of the truth distinction organizer 13, and since a big-ticket device is needed in order to carry out forgery and alteration, it is thought that it is effective in counterfeit prevention. Since it is detailed punching, the design of what this is given (for example, negotiable securities) is not spoiled. As information, there are a character, a number, a pattern, a figure, a bar code, etc.

[0059]As mentioned above, although the embodiment concerning the truth distinction organizer and its truth discriminating device of this invention was described based on the example, it cannot be overemphasized that this invention has various embodiments thru/or examples within limits which are not specified as the above-mentioned example and indicated to the claim.

[0060]

[Effect of the Invention]Information punching where the shape which is hard to view to the field which forms pattern information is detailed according to this invention of the above-mentioned composition, Since shape and an arrangement direction are changed and formed, it is very difficult, and when laser punching is used, a big-ticket processing machine is required for forming detailed

punching of the same shape and an arrangement direction, and the forgery from these fields and an alteration preventive effect are very large [a thing].

[0061]Even if the truth distinction organizer concerning this invention is carried out for right like usual and it observes it, cannot recognize information, but. Can recognize by processing image recognition and especially about the thing using punching which changed shape and direction. By observing visually from the direction of slant besides processing image recognition, recognition of information can be performed simply, without using a discriminating device etc., two or more information can be recognized by rotating a truth distinction organizer in that flat surface, and forgery and an alteration preventive effect are very large also from this point.

[0062]The truth distinction organizer concerning this invention can be applied without being conspicuous without spoiling the design to some valued printed matter of negotiable securities forgery and preventing from an alteration, a passport, an identification card, and other various kinds, since detailed punching is used.

DESCRIPTION OF DRAWINGS [Brief Description of the Drawings]

[Drawing 1]It is a figure explaining Example 1 of the truth distinction organizer concerning this invention.

[Drawing 2]It is a figure explaining Example 1 of the truth distinction organizer concerning this invention.

[Drawing 3]It is a figure explaining the truth discriminating device of the truth distinction organizer concerning this invention.

[Drawing 4]It is a figure explaining Example 2 of the truth distinction organizer concerning this invention.

[Drawing 5]It is a figure explaining Example 2 of the truth distinction organizer concerning this invention.

[Description of Notations]

1 and 13 Truth distinction organizer

2 Substrate

3, 4, 5, 21, 22, and 23 Punching

6, 7, 8, 18, 19, and 20 Punching group

10 Light table

11 Camera

12 Computer

14 Quadrangle

15, 16, and 17 Field (some square fields)